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(54) Loading floor and a vehicle comprising such a loading floor.

(57) A loading floor (2) having two roller conveyors (5-6) located at an interval from each other and transporting means (15) for conveying freight (17) over said roller conveyors (5-6), having at least one transverse roller conveyor (7) provided with load transporting means (36) lying transversely of both said roller conveyors (5-6) and moving means whith which on the one hand both said roller conveyors (5-6) simultaneously and on the other said transverse roller conveyor (7) can be moved relative to each other in and out of their respective transporting planes.

Preferably the transverse roller conveyor (7) is mounted on a frame (32) onto which the moving means grip and using which said transverse roller conveyor (7) can be moved in and out of the common transporting plane.

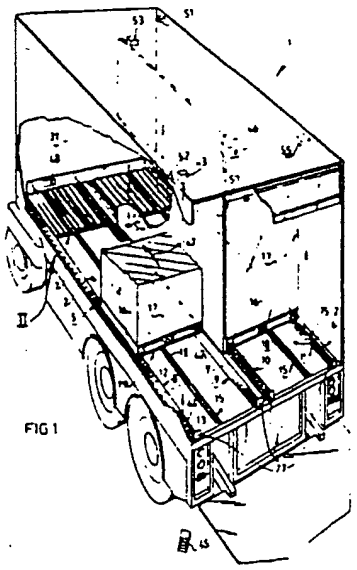

FIG 1

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Loading floor and a vehicle comprising such a loading floor

The present invention relates to a loading floor having two roller conveyors located at an interval from each other and transporting means for transporting freight over the roller conveyors.

This known loading floor is loaded by placing the freight, for instance products placed on pallets, in a row on the roller conveyer. If the loading floor forms part of a vehicle, both the roller conveyers are disposed parallel and adjacent to each other and extend substantially over the whole length and breadth. When such a vehicle is loaded, the freight has to be arranged in the row such that products for delivery can always be removed at the successive delivery addresses from the end of the row of products. A conflict occurs however when packaging or other products have to be taken away from the various delivery addresses.

If in accordance with the invention such a loading floor is characterized by at least one transverse roller conveyor provided with load transporting means lying transversely of both the roller conveyors and by moving means with which on the one hand both roller conveyors simultaneously and on the other the transverse roller conveyor can be moved relative to each other in and out of their respective transporting planes, the entire loading floor can be loaded in the form of a row via one roller conveyor and products can be removed via the other roller conveyor, while packaging can be loaded in addition. It is furthermore possible to achieve a better load distribution by transferring products from the one roller conveyor to the other. Because in many cases the transverse roller conveyor occupies the smallest area and can therefore be moved with comparatively little power, it is recommended that the transverse roller conveyor is mounted on a frame onto which the moving means grip and using which the transverse roller conveyor can be moved in and out of the common transporting plane.

If the transverse roller conveyor can be moved with its frame from a rest position situated at a lower level relative to the transporting plane of both roller conveyors into a transverse transporting plane located at a higher level relative to this transporting plane, the load is first carried via a roller conveyor to a position above the transverse roller conveyor which then performs the transverse transporting in the transporting plane located at the higher level and places the load on the other roller conveyor by returning to the rest position situated at a lower level. Thus is avoided any conflict and friction between the roller conveyors operating transversely of each other.

If during the movement towards the transverse transporting plane the frame of the transverse roller conveyor displaces over a distance a and in the same direction as the transporting direction of a roller conveyor supplying freight, a piece of freight is removed from the row and placed at a distance away from it before transverse transporting can take place, so that during the transverse transporting disturbances or obstruction occur as little as possible. According to a preferred embodiment, the transverse roller conveyor is located at the end positions of both the roller conveyors. It is however possible that the transverse roller conveyor connects the two roller conveyors at other places, so that an integrating loading floor location can be realized.

An optimum loading and maximum freedom of loading is achieved when both roller conveyors form a transporting loop with two transverse roller conveyors. The load can in this way be transported over the loading floor in a path with the form of a closed loop and the freight can be added to the row or removed from it as required from the loading and unloading position.

A rapid loading of the loading floor is achieved if control means regulate the load transport over both roller conveyors and over the transverse roller conveyor or conveyors.

If the loading floor is arranged in a vehicle, not only does the load have to be guided during transportation over the roller conveyor but shifting of the load has also to be prevented during movement of the vehicle, and recommended for this purpose is that the roller conveyors which extend parallel and adjacent to each other are separated by a partition wall. Certainly in the case that the load is reasonably high it is recommended that the frame of the transverse roller conveyor is provided with a stop wall so that vehicle walls and other boundings of the loading floor cannot come into contact with the load that is present.

The mentioned and other features will be elucidated with reference to two embodiments of a loading floor according to the invention, which in the case of both these embodiments, is accommodated in a vehicle. It will however be apparent that the loading floor according to the invention can be employed in further places and is certainly not restricted to a vehicle floor.

In the drawing:

Fig. 1 and 3 show perspective, partly broken away views of a vehicle that is provided with a loading floor in accordance with the invention; and

Fig. 2 shows on a larger scale a partly broken away, perspective view of detail II from fig. 1.

Fig. 1 shows a vehicle 1 provided with a loading

floor 2 according to the invention. Loading floor 2 is provided with two roller conveyors 5 and 6 extending parallel to each other over the whole length of the loading floor 2 and a transverse roller conveyor 7 extending transversely thereof. The length of the transverse roller conveyor is substantially equal to the width of vehicle 1 and the width of the roller conveyors 5 and 6 together.

Roller conveyors 5 and 6 are each built up of two rows 8,9, 10,11 of rollers 13 sunk into and mounted for rotation in a profile 12. Each profile 12 rests on an air hose (not shown) and is arranged and guided in loading floor 14 such that when the air hose (not shown) is inflated with air the rollers 13 protrude above loading floor 14 and when the pressure is removed from the air hose they lie sunk into the loading floor 14. The transporting means 15 for transporting products 17 placed on a pallet 16 over the roller conveyors 5 and 6 comprise an endless rotating chain 18, the upper part of which runs over and through a plate supported by an air hose so that when air is fed into the air hose the chain 18 protrudes above the loading floor 14 and grips onto the bottom surface 19 of pallet 16 and displaces the pallet 16 with product 17 over rolls 13 when chain 18 is driven.

As fig. 2 shows in more detail, the transverse roller conveyor 7 consists of a number of elongate rolls 20 which are mounted for rotation with shaft end parts 21 and 22 in respectively a corner profile 23 and an H-profile 24. Extending between rolls 20 are cross members 25 which are rigidly connected to profiles 23 and 24. Each cross member 25 is provided on its underside with an indentation 26 which is substantially complementary to a wedge 28 attached to a sunken loading floor portion 27. An upward inclining side 29 of the indentation 26 rests on the side face 30 of cross member 25. The side 29 and the side face 30 slope upward in the direction of a wall 31 of vehicle 1. The frame 32 of transverse roller conveyor 7 is formed by the profiles 23 and 24 and the cross members 25 connecting these profiles. Frame 32 rests on the wedges 28 which are enclosed at the sides by cross plates 33 and 34 attached to cross member 25 on either side of wedge 28. The frame 32 is further connected via hydraulic cylinders 35 to the floor portion 27. Hydraulic cylinders 35 and wedges 28 form the moving means for the rolls 20 mounted in frame 32. The transporting means 36 for the transverse roller conveyor 7 comprise a toothed wheel 37 attached to each shaft end part 22, which wheel grips onto a chain 38 driven with a toothed wheel 39 of the motor 40.

A stop wall 41 is further attached to the H-profile 24.

Fig. 2 shows the rest position for the transverse roller conveyor 7, whereby an imaginary transporting surface resting on rolls 20 is situated at a lower level than an imaginary transporting surface resting on the rolls 13 protruding above loading floor 14. When cylinders 35 are actuated the transporting surfaces of the transverse roller conveyor 7 and the roller conveyors 5 and 6 come first to lie in one plane, and the transporting surface of transverse roller conveyor 7 subsequently comes out on a level lying above this plane. In this way a pallet 16 can be removed from the roller conveyor 5 and be displaced at a higher located level in transverse direction to the other roller conveyor 6, without any contact occurring with either of roller conveyors 5 and 6. This contact is first restored after transverse roller conveyor 7 has returned to the position shown in fig. 2.

It will be apparent that what is involved here is a relative movement between on the one hand the transverse roller conveyor 7 and on the other both roller conveyors 5 and 6, so that instead of the situation shown the transverse roller conveyor 7 can in the other situation be stationary and both roller conveyors 5 and 6 mobile. All that is essential is that during transporting the relevant transporting surface is located at a higher level than the other transporting surface.

In the description following hereinafter of the operation of loading floor 2 according to the invention, the control means are also described.

Using a lifting truck (not shown) a product placed on a pallet is positioned on the roller conveyor 5 at the loading location 42 indicated with dashed lines. The presence of the product at the loading location 41 is detected by the detector 43, because the light path is interrupted between detector 43 and the co-operating reflector 44 which occupies the position of a roll 13. The control means are actuated by supplying a signal from a manually operated transmitter 45 to the receiver 46. After the air hoses for both roller conveyors 5 and 6 and the chains 18 have been pumped up, chains 18 are driven until the loading location 42 is free. On repetition of the above described loading process (whereby the air hoses remain under pressure), products 17 are displaced in the direction of arrow 47 until a product that has been displaced over the roller conveyor 5 to a position above the transverse roller conveyor 7 actuates a roll switch 48. Driving of chains 18 is stopped and the cylinders 35 are then actuated so that the transverse roller conveyor 7 moves from the rest position from fig. 2 to the transporting position, in which the transporting plane of the transverse roller conveyor 7 is located at a higher level than that of the roller conveyors 5 and 6. The rest position of the transverse roller conveyor 7 is indicated by the proximity switch 49 and the transporting position by the proximity switch 50. When the transporting position

is reached the motor 40 is actuated, which results in the rolls 20 beginning to rotate and the pallet resting on the transverse roller conveyor 7 being conveyed from above roller conveyor 5 to above roller conveyor 6. The transverse transportation or actuation of motor 40 is interrupted when the light path between the detector 51 and reflector 52 is interrupted. Using cylinders 35 the transverse roller conveyor 7 is subsequently displaced into the rest position shown in fig. 2, whereby the pallet is transferred and rests on the rolls 13 of roller conveyor 6. The chain 18 of roller conveyor 6 is then driven as long as necessary until the pallet is no longer situated above transverse roller conveyor 7, a position detected by detector 53 and its co-operating reflector 54.

Loading and transverse transporting can be repeated as often as necessary until a product reaches the unloading position 75, this being detected by detector 55 and the co-operating reflector 56. Projections 77 prevent unexpected and unwanted transporting over roller conveyors 5 and 6 outside of the vehicle.

It can be deduced form the above that the load can be transferred via the transverse roller conveyor 7 from the one roller conveyor 5 or 6 onto the other by way of a hairpin-like path which is bounded on the inside by a partition wall 57.

Fig. 3 shows a vehicle 3 according to the invention that is provided with a loading floor 4 according to the invention. Identical elements or elements having the same action have been given the same reference numeral, while elements occurring twice are provided with an accent symbol. The transverse roller conveyor 7' is distinguished from roller conveyor 7 by the absence here of the roll switches 48 and 48', because these functions are superfluous and are taken over by the detectors 43 and 55 as well as the detectors 58 and 59 which are equivalent to the detectors 53 and 53' and which record a product leaving the transverse roller conveyor 7'.

In the vehicle 3 a transporting loop 60 is thus formed by the roller conveyors 5 and 6 and the respective transverse roller conveyors 7 and 7' placed at the end wall positions thereof.

It should be noted that in the case of both embodiments there has been no rotation of the load relative to the input position during the circulating transporting, so that the load can be picked up by the forks of the fork-lift truck at the loading and unloading position.

Claims

1. A loading floor having two roller conveyors located at an interval from each other and transporting means for conveying freight over said roller conveyors, characterized by at least one transverse roller conveyor provided with load transporting means lying transversely of both said roller conveyors and by moving means with which on the one hand both said roller conveyors simultaneously and on the other said transverse roller conveyor can be moved relative to each other in and out of their respective transporting planes.

2. A loading floor as claimed in claim 1, characterized in that the transverse roller conveyor is mounted on a frame onto which the moving means grip and using which said transverse roller conveyor can be moved in and out of the common transporting plane.

3. A loading floor as claimed in claim 1 or 2, characterized in that the transverse roller conveyor can be moved with its frame from a rest position situated at a lower level relative to the transporting plane of both roller conveyors into a transverse transporting plane located at a higher level relative to this transporting plane.

4. A loading floor as claimed in claim 3, characterized in that during the movement towards the transverse transporting plane the frame of the transverse roller conveyor displaces over a distance a and in the same direction as the transporting direction of a roller conveyor supplying a load.

5. A loading floor as claimed in claims 1-4, characterized in that the transverse roller conveyor is located at end wall positions of both roller conveyors.

6. A loading floor as claimed in claims 1-4, characterized in that both roller conveyors form together with two transverse roller conveyors a transporting loop.

7. A loading floor as claimed in claims 1-6, characterized by control means for regulating the transport of the load over both roller conveyors and over the transverse roller conveyor or conveyors.

8. A loading floor as claimed in claims 1-7 that is arranged on a vehicle.

9. A loading floor as claimed in claims 1-8, characterized in that the roller conveyors which extend parallel and adjacent to each other are separated by a partition wall.

10. A loading floor as claimed in claims 1-9, characterized in that the frame of the transverse roller conveyor is provided with a stop wall.

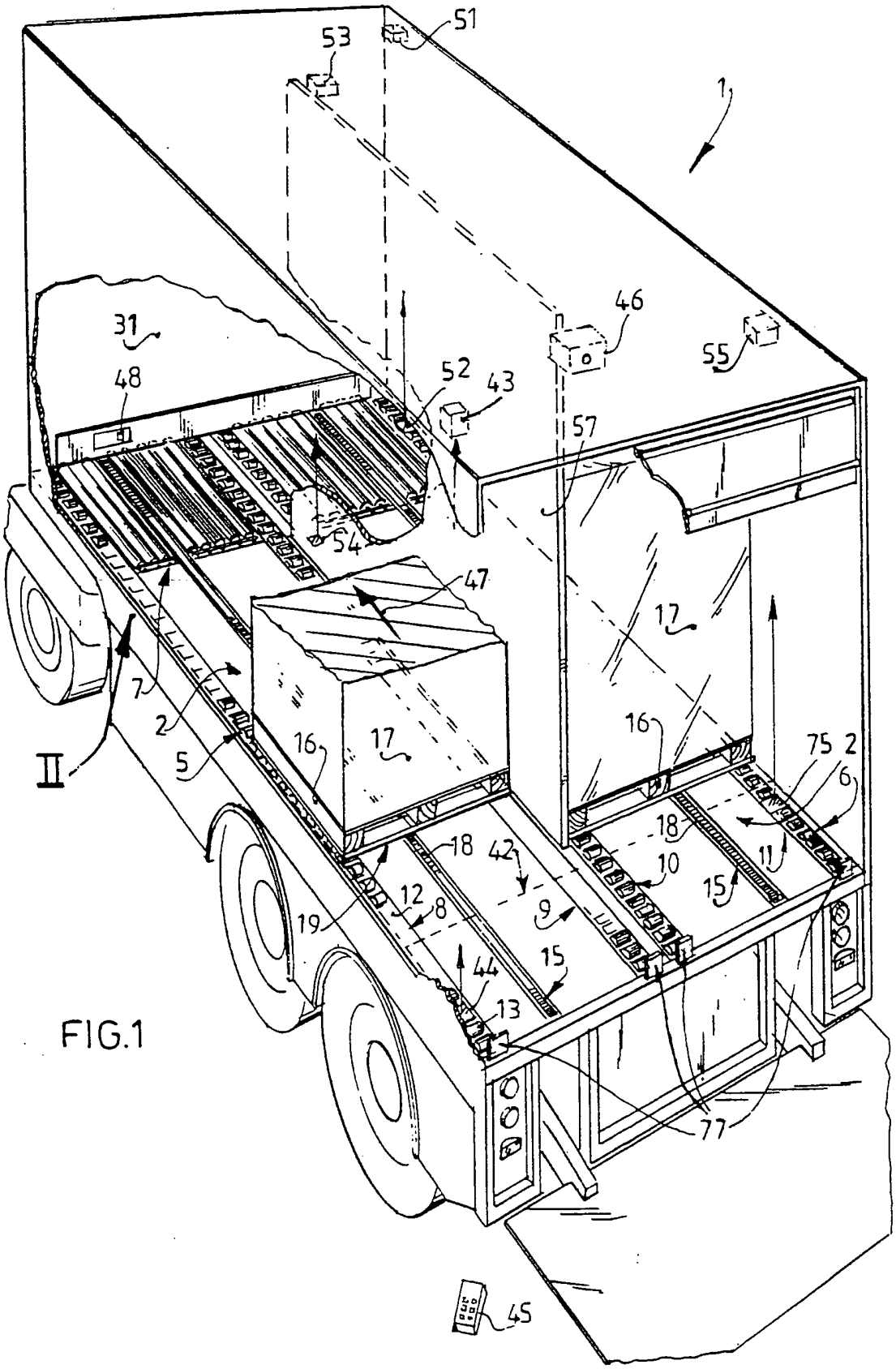
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FIG.1

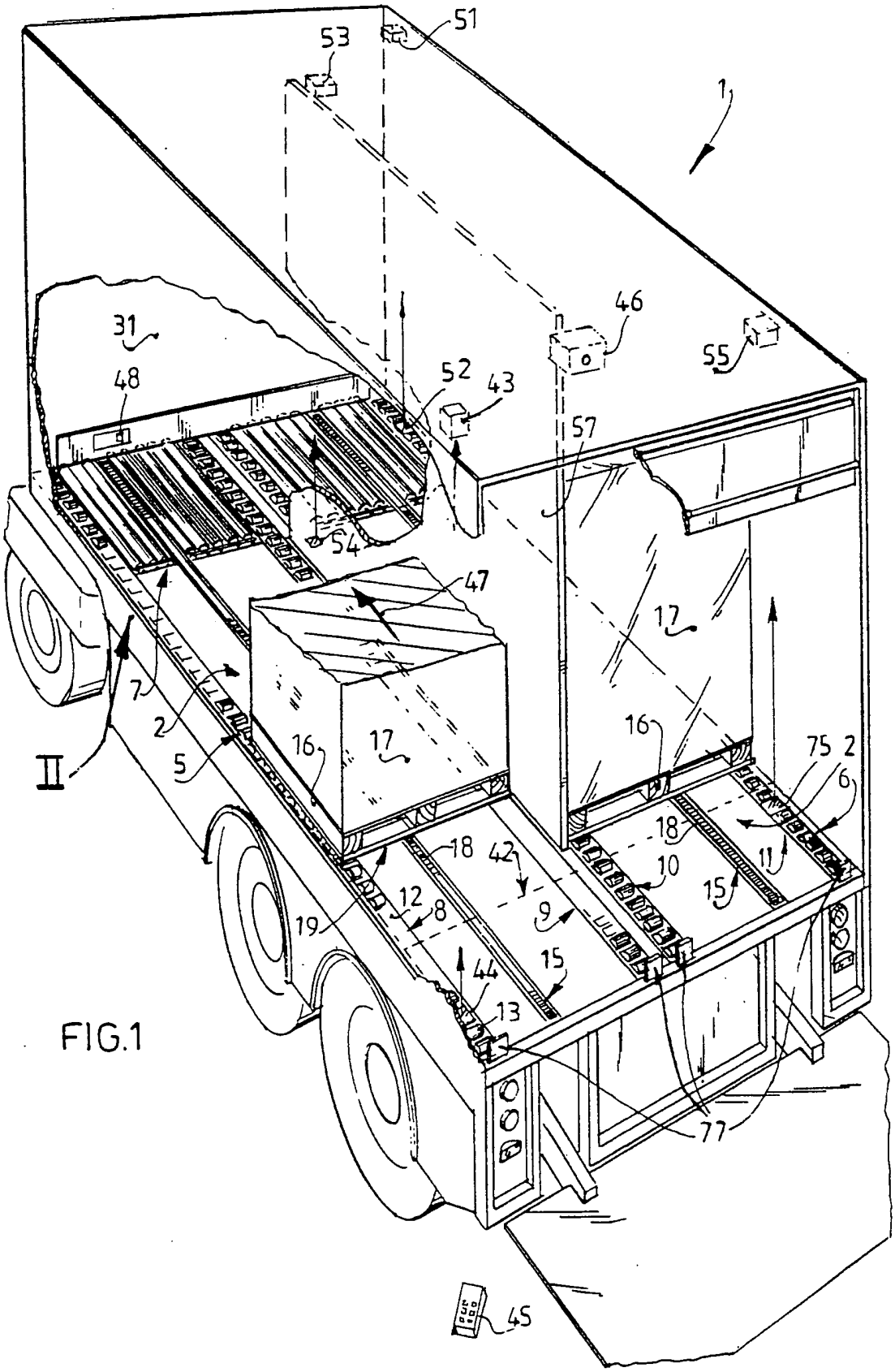
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FIG.1

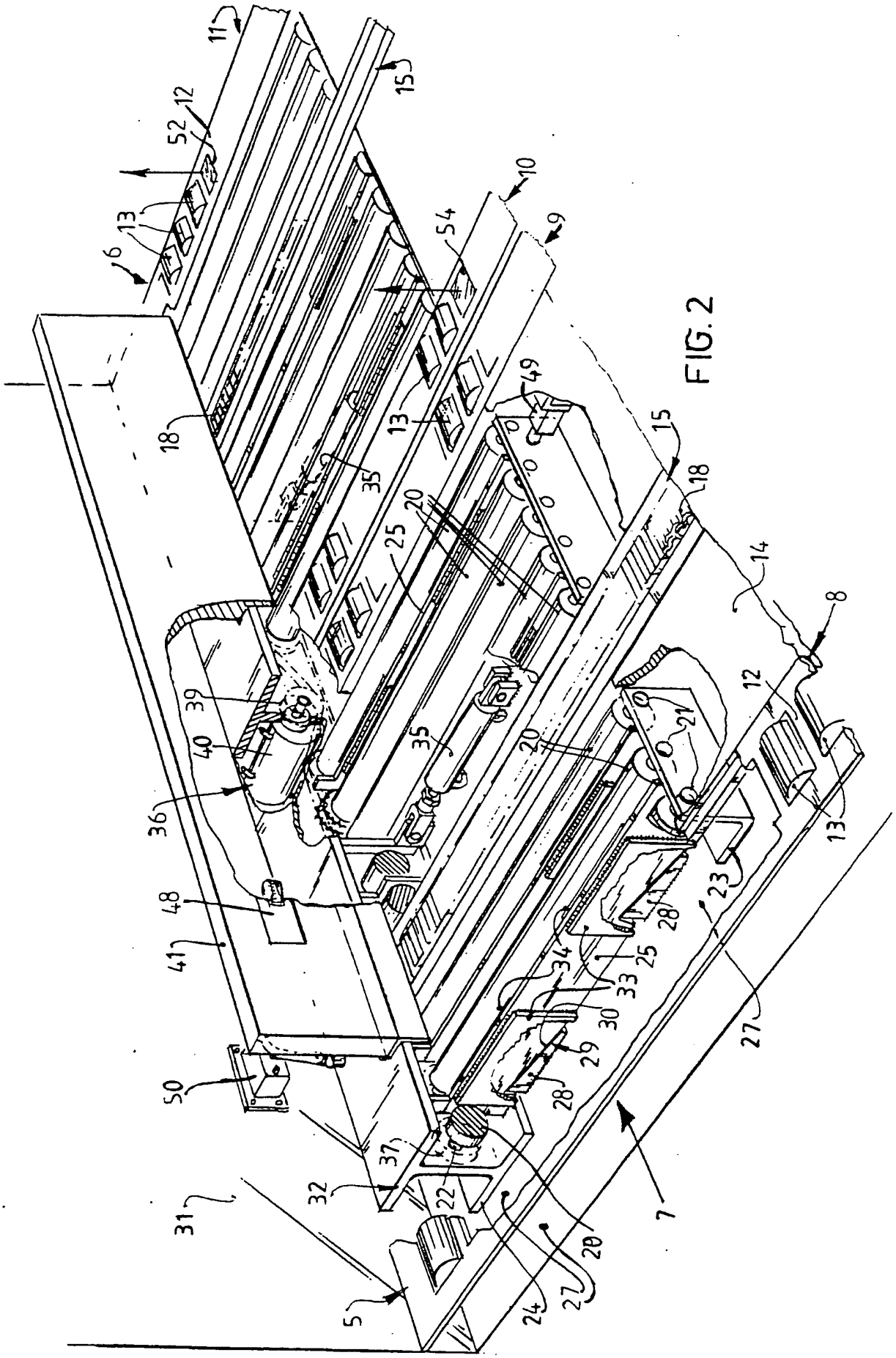
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FIG. 2

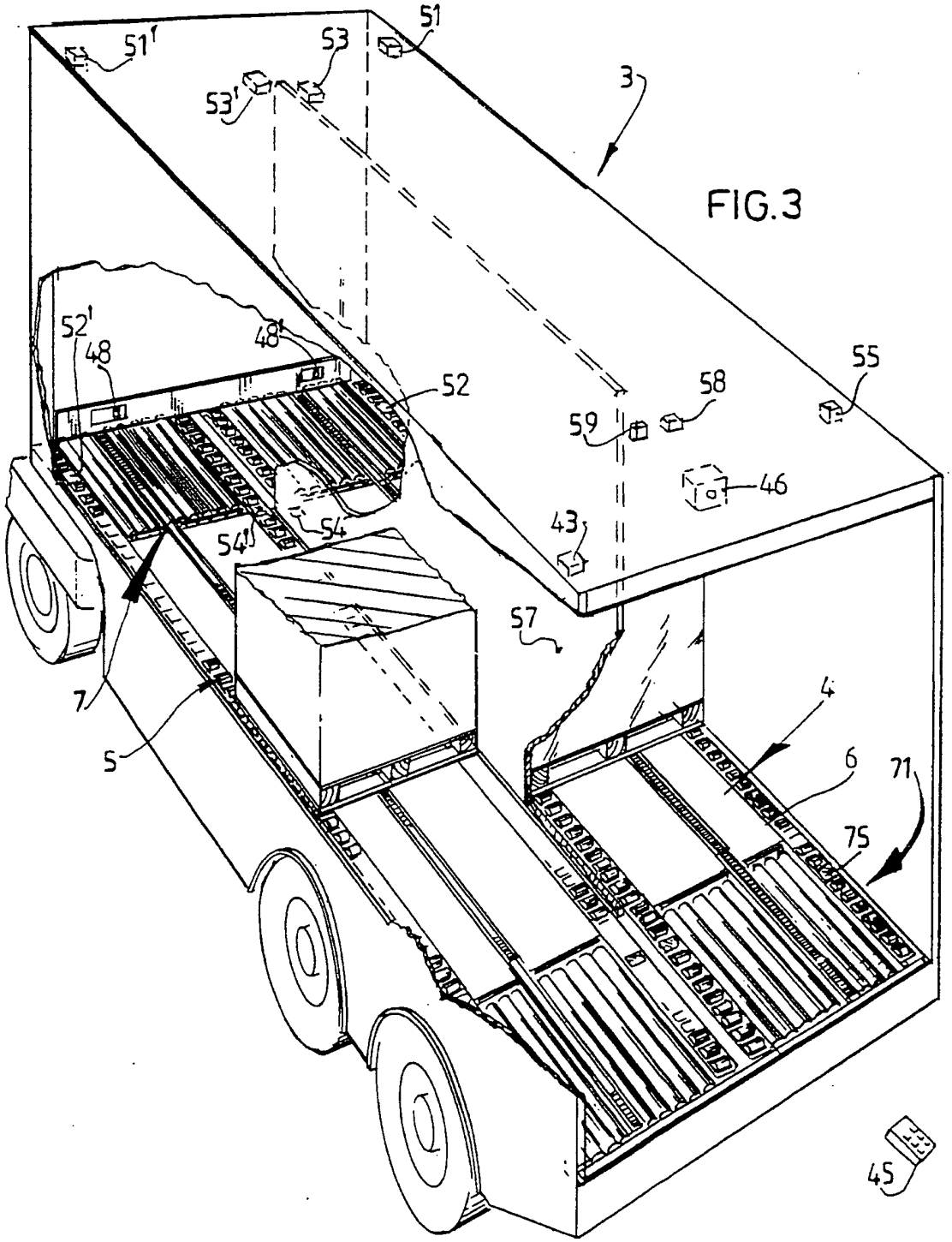

FIG.3

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 87 20 2152

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
X	US-A-3 904 022 (LUTZ) * Figures 1,5; claims 1,2 *	1-3,5-8	B 60 P 1/52
X	FR-A-2 401 082 (MASYC AG) * Claims 1,2 *	1-3	
A	US-A-2 534 057 (PRIDE) * Claims 1,2 *	1	

TECHNICAL FIELDS SEARCHED (Int. Cl.4)

B 60 P

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	29-01-1988	SCHMITTER J.M.

CATEGORY OF CITED DOCUMENTS

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